GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
SPONSORED PROJECT INITIATION

No action OH

Date: March 21, 1979

Project Title: Consulting

Project No: A-2342

Project Director: Lynn Tessner

Sponsor: Choice-Vend, Inc.

Agreement Period: From 3/12/79 Until 3/31/79

Type Agreement: Ltr. dtd. 3/12/79

Amount: $800

Reports Required: Final Report

Sponsor Contact Person (s):

Technical Matters	Contractual Matters (thru OCA)
Mr. Jerome Nathan Exec. VP Choice-Vend, Inc. Box 250 Windsor Locks, Conn. 06096 (203)623-2551	

Defense Priority Rating:

Assigned to: Technology & Development (School/Laboratory)

COPIES TO:

- Project Director
- Division Chief (EES)
- School/Laboratory Director
- Dean/Director–EES
- Accounting Office
- Procurement Office
- Security Coordinator (OCA) ✓
- Reports Coordinator (OCA)
- Library, Technical Reports Section
- EES Information Office
- EES Reports & Procedures
- Project File (OCA)
- Project Code (GTRI)
- Other _____

CA–3 (3/76)

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION

Date: June 1, 1979

Project Title: Consulting

Project No: A-2342

Project Director: Lynn Tessner

Sponsor: Choice-Vend, Inc.

Effective Termination Date: 3/31/79

Clearance of Accounting Charges: 4/30/79

Grant/Contract Closeout Actions Remaining:

- X Final Invoice and Closing Documents
- _ Final Fiscal Report
- _ Final Report of Inventions
- _ Govt. Property Inventory & Related Certificate
- _ Classified Material Certificate
- _ Other _____

TERMINATED

Assigned to: Technology & Development (School/Laboratory)

COPIES TO:

Project Director
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Library, Technical Reports Section
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Project File (OCA)
Project Code (GTRI)
Other _____

CA-4 (1/79)

A-2342
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ENGINEERING EXPERIMENT STATION
GEORGIA INSTITUTE OF TECHNOLOGY • ATLANTA, GEORGIA 30332

March 30, 1979

Mr. Jerome Nathan
Executive Vice President
Choice-Vend, Inc.
Box 250
Windsor Locks, CT 06096

Dear Mr. Nathan:

Because your operation is large and the need to control excessive noise accute, it would seem prudent to purchase a B&K Instruments, Inc., or similar, sound level meter and a 1/3-octave filter set. These two instruments will allow one of your engineers to analyze your noise problems.

While the sound levels in your shop were being measured only two roll feed presses were being used. These were machine #9 and #52. Had machines #52 and #54 been running, the db. level would have been much higher. It may be necessary to prohibit the use of #52 and #54 at the same time if the noise level cannot be significantly reduced.

Nearly all the noise sources can be cured with proper maintenance. There is a good chance that the remaining noise can be suppressed for only a small expenditure.

The press area is a very "live" area; the walls and floor are hard and smooth, and the ceiling is also hard. The net result is a high level of background noise (up to 88 dbA) which makes getting below 90 dbA difficult. Covering the walls and the ceiling with sound-absorbing materials would help, but would not cure the problem. The use of better mufflers on the fork trucks, or the use of electric fork trucks would also help. The four air compressors could also be enclosed. All of the foregoing should yield a reduction of from 3 to 5 dbA, which is not a great deal of reduction but an important one that may have to be undertaken if it proves impossible to get down as low as 90 dbA otherwise.

The first area of noise reduction should be on the web feeders. The noise generated by these feeders is very high, and the cure should be inexpensive. The noise is generated in two directions: when the air-powered clamp retracts, and when it advances, feeding the web. During the time the ram moves from the bottom of its stroke to the top, the web feeder retracts with a loud slap, clamps the web and feeds the web forward, stopping with a loud crash.

If the clamp were timed to start retracting during the down-stroke of the ram, the clamp could move more slowly and with much lower air pressure. Now, when the clamp reaches the end of its travel it runs into a metal plate at full speed and the resulting slap has a peak of 117 db. If a lower drive pressure were used, and/or a flow restrictor (needle valve) was in the line, the clamp would not slap so loudly. It may also be possible to put an air cushion stop on the air cylinder. The metal surface that the clamp slaps could also be rubber covered.

During the web feeding part of the cycle, the web is powered very rapidly forward and then stopped by the clamp striking the end plate of the feeder. The resulting crash is transmitted to the full length of the web, which acts as a speaker diaphragm. If the existing cushion was operating, the sound level would be much lower. Also, by using the entire time that it takes the ram to return to the top of its stroke for moving the web forward, it could be moved at a lower rate. The slow travel rate and the use of the repaired air cushion should reduce the sound level to below 90 dbA for that part of the cycle.

The web of metal being fed to the machine now slaps a roller conveyer and the floor. If the floor and roller conveyor were covered by thick cocoa brush mats (such as stock #6883T23, in the McMaster-Carr Supply Co. catalog), the web slap noise should be reduced. In addition, if a strip of canvas or carpet was held at one end in such a way as to cover most of the web while allowing it to slide under the canvas, the web noise would be further reduced.

On machine #52, the driver motor, clutch, and flywheel are in need of overhaul. When running at idle the noise at the operator station is 85 dbA; at the rear of the machine it is 89-90 dbA. The manufacturer should be contacted for information on quieting the drive. If it cannot be quieted, the unit will have to be enclosed.

On machine #9, the bull gear is ringing at a level of 88 dbA when standing at the operator station. There are three ways to reduce the noise level:

1. Use a fiber pinion gear to drive the bull gear.

2. Cover the gear with a sound-damping substance.

3. Totally enclose the gear and its drive in a "soundproof" box.

Again, the manufacturer can supply data on the possible use of a fiber gear. If the load is too large for a fiber gear, the other approaches will have to be used.

On machine #9, the single cycle clutch produced a great deal of noise--101 db peak. The entire linkage for the air cylinder is very loose and free to

vibrate. The cylinder needs an air cushion and/or a rubber stop. At present, the clutch release arm strikes the frame of the machine when the clutch is released.

All of the machines appear to be mounted on pads, but the pads do not seem to be tuned to suppress unwanted sound. In fact, press #52 causes the floor to vibrate strongly. If the correct pads were under the machines, less vibration should reach the floor.

The machine tends to vibrate at 31.5-500 Hz. With the resonance frequency and weight of the machine, a number of suppliers can furnish correctly tuned pads for the press.

Press number #9 has a resonance frequency of 60-250 Hz.

As you can see, the major source of noise is caused by poor maintenance and poor machine installation. If the mechanical problems are corrected the sound level should fall close to the 90 dbA level needed to comply with OSHA requirements. At that time, the question of sound-absorbing material for the walls and ceiling and separating partitions will have to be considered. It may prove more economical to rotate the men from machine to machine instead of trying to get every machine down to 90 dbA.

Most of the other presses can be quieted by installing better air mufflers and/or by aiming the mufflers toward the ceiling, or back wall instead of toward the operator. The models installed are not doing the job. Without the air problem, most of the other presses will meet OSHA requirements because of their long cycle times.

As a state employee I cannot recommend one brand over another, but I can say that we have found B&K instruments to be very good and also very expensive. There are a number of companies that make similar equipment which you might wish to consider. The B&K people very often put on mini-seminars on sound control all over the country, so it is an easy matter to have one of your men trained to handle your problems in this area.

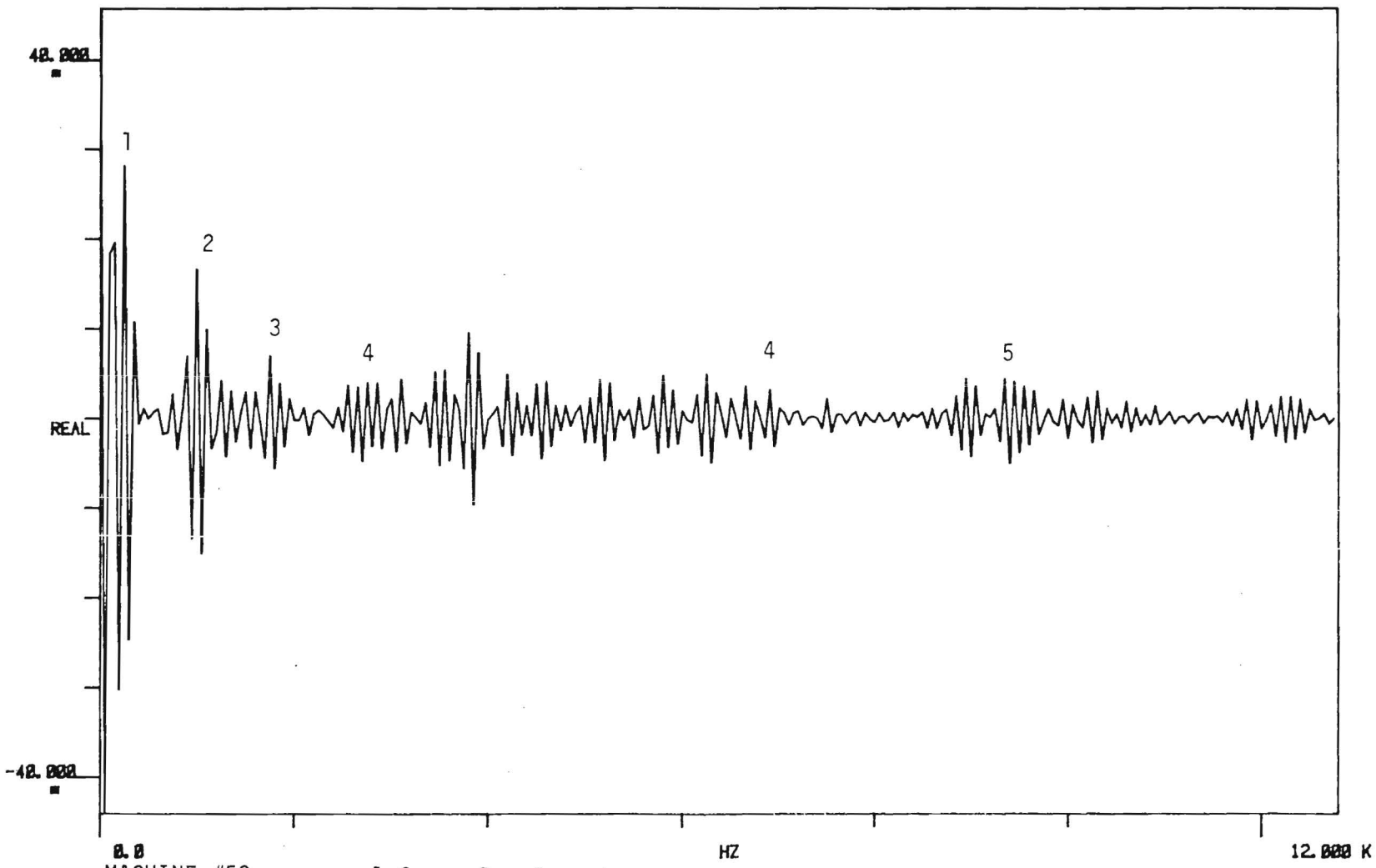
Yours sincerely,

R. L. Tessner
Research Engineer

RLT:j

Enclosures

Copy: Dr. Jack R. Walker, Ph.D.,R.P.E.
671 Valley Green Drive, NE.
Atlanta, GA 30342



MACHINE #52

1-3: Ram Impact
4-4: Strip Feeder/Slap
5: May also be feeder.